

REMARKS

Applicant appreciates the withdrawal of the requirement to elect.

In section 3 of the action, the examiner requires amendment to the drawings or cancellation of those claims reciting that the "tube expands longitudinally." Claims 2, 11, and 20 are canceled by this amendment, and applicant requests that this objection be withdrawn.

In section 5 of the action, the examiner rejected claims 2, 11, and 20 under 35 USC 112, first paragraph, as failing to comply with the enablement requirement. These claims are canceled by this amendment, and applicant request that this objection be withdrawn.

In section 7 of the action, claims 1, 2 and 9 stand rejected under 35 USC 112, second paragraph, as being indefinite. Applicant has amended claim 1 to indicate that the subject matter being claimed is a high pressure seal in combination with first and second mating parts. Therefore, applicant requests that this rejection be withdrawn.

In section 9 of the action, claims 1, 2, 4, 7, 8, 9, 19, 20, 22, and 23 stand rejected under 35 USC 102(b) as being anticipated by Hojyo et al, 6024056. Hojyo teaches a deformable and radially expandable seal to provide a cooling water passage between the opposing block portions of an internal combustion engine. The seal taught by Hojyo is suitable only for use in low pressure situations such as that found in the cooling water system of an internal combustion engine. Because the pressures to which the seal is subjected are relatively low, the seal must be made of a material that is easily deformable. For example, in column 6 at line 65, the specification states that the connecting pipe 46 is formed of rubber having a high elasticity. Throughout the specification it is clear that the seal employed by and taught by Hojyo must have the characteristics just described.

To the contrary, the seal described in the instant application is a high pressure seal that may be subjected to pressures in excess of 20,000 psi. The seal taught by Hojyo would not only be completely unsuitable for such high pressure applications, but would most certainly fail and not even be considered by one skilled in the art. Consequently, not only does Hojyo not teach or suggest a high pressure seal as claimed by the applicant, but Hojyo should not even be considered to be prior art that would be considered by one seeking to develop such a seal.

Hojyo also does not teach or suggest providing a seal between first and second mating parts, as claimed by the applicant. As shown clearly in the drawings of Hojyo, the opposing engine portions are not mating or in abutment with one another. Instead, the seal of Hojyo merely forms a flexible connecting passage between two separate engine portions. Consequently, applicant requests that this rejection be withdrawn.

In section 10 of the instant action, claims 1, 3, 4, 7, 8, 9, 19, 21, 22, and 23 stand rejected under 35 USC 102(b) as being anticipated by Pruyn, US 1225855. Pruyn teaches a bushing that is designed to join two sections of steel cylinder that are driven into the ground to form concrete piles that can then support a structure. While the bushings taught by Pruyn do provide some sealing capability in the sense that they prevent concrete in plastic form from leaking out of the cylinders prior to hardening, the bushings can in no way be considered to be high pressure seals as claimed by the applicant. Furthermore, the bushings do not expand radially in response to a pressurized fluid within the bushing as also expressly claimed by the applicant. Consequently, Pruyn not only does not anticipate applicant's claims, but does not even teach or suggest anything having to do with the subject matter as claimed by the applicant. Therefore, applicant respectfully requests that this rejection be withdrawn.

In section 12 of the instant action, claims 10, 12, 14, 15, 16, 17, and 18 stand rejected under 35 USC 103(a) as being unpatentable over Wich, US 4408718, in view of Kenny, US 959546. The examiner states that Wich discloses the limitations of the claimed invention with the exception of the high pressure seal connecting the first bore and the second

bore, and that Kenny discloses a tubular cylindrical seal that would have been obvious to use to replace the o-ring of Wich.

Wich discloses a fuel injector that suffers from the same need for high pressure sealing as faced by the applicant. However, Wich uses conventional o-ring seals to accomplish the sealing function, as described, for example, in column 6 at lines 18 through 22. This is exactly the situation that applicant's invention has improved upon by providing a tubular seal that expands radially in response to the high pressures encountered in fuel injection technology. Kenny teaches another sealing device for concrete pile structures that are driven into the ground until they reach bedrock or another suitable supporting surface. Again, the structure of Kenny does provide some sealing capability to prevent concrete in plastic formed from leaking from adjoining sections of the pipe until the concrete has hardened. However, Kenny does not teach a high pressure seal that expands radially in response to a pressurized fluid, as specifically claimed by the applicant. Consequently, the structure taught by Kenny would be completely unsuitable to replace the o-rings disclosed by Wich. Furthermore, no one skilled in the art of fuel injectors would consider the teachings of Kenny to provide any indication of how such a high pressure seal could or should be utilized. Therefore, the combination fails to teach or suggest expressly claimed limitations in applicant's instant application, and applicant respectfully request that this rejection be withdrawn.

The Examiner also states that, with respect to claims 14 and 15, Wich in view of Kenny discloses the claimed invention except for the thickness of the seal, and that it would have been obvious to one of ordinary skill in the art to make the seal less than one millimeter thick. However, in view of the foregoing discussion about the inapplicability of Wich, Kenny, or the combination of the two, this conclusion is moot.

In section 13 of the action, claims 5 and 6 stand rejected under 35 USC 103(a) as being unpatentable over Pruyn, US 1225855. The Examiner states that Pruyn discloses the claimed invention except for the thickness of the seal, and that it would be obvious to one

of ordinary skill to make the seal less than one millimeter thick. Pruyn is discussed earlier in these remarks, and applicant contends that the seal of Pruyn is not suitable for the application as specifically claimed by the applicant, that it would not have been considered by one of ordinary skill in the art, and that it fails to teach or suggest a seal suitable for use in applicant's invention. Therefore, applicant respectfully request that this rejection be withdrawn.

In section 14 of the instant action, claims 10, 13, 16, 17, and 18 stand rejected under 35 USC 103(a) as being unpatentable over Wich, US 4408718 in view of Kohlman, US 5944319. The Examiner states that Wich discloses the limitations of the claimed invention with the exception of the high pressure seal connecting the first and second bores, that Kohlman discloses a tubular cylindrical seal, and that it would have been obvious to a person having ordinary skill in the art of the time of the invention to have replaced the o-ring of Wich with the seal of Kohlman to provide multiple and backup sealing surfaces.

Applicant has discussed the inapplicability of the Wich reference in the remarks above. Kohlman discloses a method of forming a metal to metal seal between two confronting faces of pressure containing bodies. The apparatus taught by Kohlman requires machined and beveled seats on each of the mating portions and on each end of the seal. The mating portions are then clamped together using bolts to force the precisely machined mating portions into tight alignment with one another. In other words, Kohlman requires that both the seal and the mating portions be machined to provide first and second clamping faces to energize the seal. This is discussed in the Kohlman patent, for example, in column 1.

The structure required for the Kohlman apparatus differs in virtually every way from the seal described and expressly claimed by applicant. The Kohlman seal is not a tube that fits into first and second bores of the mating parts. Furthermore, the seal taught by Kohlman does not expand radially about an axis in response to pressurized fluid within the hollow bore. Instead, as described in column 3 beginning at lines 11, application of internal pressure in the Kohlman device promotes deflection of the metal sealing ring at truncated

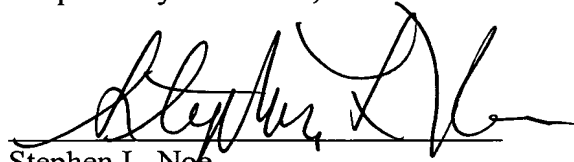
angular corners which causes the beveled portions to press more tightly against one another and provide an improved sealing surface. As claimed, applicants seal expands radially about an axis and does not employ the beveled portions required by Kohlman.

Furthermore, the Kohlman seal would be completely impractical to utilize in applications such as that described by the applicant. The use of the machined portions and the requirement that the mating parts be bolted or otherwise clamped together would be impractical in applicant's application. Consequently, one skilled in the art, considering the problem to be solved by applicant, would not even consider the seal taught by Kohlman. For all these reasons, applicant respectfully requests that the rejection be withdrawn.

Applicant has fully considered the examiner's objections, rejections, and remarks concerning the prior art, and has responded to each of these in the foregoing amendments and comments. Applicant believes that all of the objections and rejections are hereby overcome, and requests that the examiner pass this case to issue. No new matter is added by any of the amendments made by applicant.

It is respectfully urged that the subject application is in condition for allowance and allowance of the application at issue is respectfully requested.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Stephen L. Noe", written over a horizontal line.

Stephen L. Noe
Registration No. 30,482
Intellectual Property Patent Attorney
Caterpillar Inc.

Telephone: (309) 675-5214
Facsimile: (309) 675-1236